

Serial No.: 10/634,208
Amendment Dated: August 13, 2004
In response to Office Action Dated: May 26, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A tufting machine for forming tufts of yarns in a backing material passing therethrough, comprising:

at least one needle bar having a series of spaced needles positioned therealong;

a yarn feed unit comprising:

a plurality of yarn feed devices each including a drive motor and a drive roll for feeding a supply of yarns to said needles along said needle bar;

a plurality of yarn feed controllers electrically connected to said drive motors of said yarn feed devices for controlling the feeding of the yarns to said needles;

a yarn distribution device including at least one tube bank section through which the yarns are passed to said needles; and

a control system in communication with said yarn feed controllers of said yarn feed unit for providing control signals based on programmed pattern information to said yarn feed controllers, said control system including a yarn feed unit system controller running at least one network over which

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said yarn feed controllers receive instructions from and communicate with
said system controller.

2. (original) The tufting machine of claim 1 and wherein said yarn feed unit comprises a self-contained attachment having a predetermined number of yarn feed devices and adapted to be releasably mountable on the tufting machine.
3. (original) The tufting machine of claim 1 and further comprising a series of yarn feed units mounted across the tufting machine and each supplying a series of yarns to a selected group of needles.
4. (original) The tufting machine of claim 1 and wherein said yarn feed distribution device includes at least two separate tube bank sections and each of said yarn feed devices feeds at least two yarns to said needles.
5. (original) The tufting machine of claim 4 and wherein said tube bank sections are scrambled.
6. (original) The tufting machine of claim 1 and wherein each of said yarn feed controllers includes a control processor in communication with said control system, and a series of motor controllers that communicate with and control operation of said drive motors of said yarn feed devices.

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7. (original) The tufting machine of claim 1 and wherein said yarn feed controllers each comprise a circuit board having a control processor and a series of motor controllers, each in communication with said control processors and with at least one of said drive motors of said yarn feed devices for controlling the feeding of the yarns by said drive motors.
8. (canceled)
9. (previously amended) The tufting machine of claim 1 and further comprising a housing having a series of mounting plates for mounting said yarn feed devices within said housing.
10. (original) The tufting machine of claim 1 and wherein each of said yarn feed drive units further includes a drive roll and an idler roll between which a yarn is engaged and drawn for feeding to a needle.
11. (original) The tufting machine of claim 10 and wherein said drive roll of each yarn feed unit includes a gripping surface.
12. (previously amended) The tufting machine of claim 1 and wherein said yarn feed devices each further include at least one yarn guide for feeding the yarn to a drive roll.

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13. (original) The tufting machine of claim 1 and further comprising a design center computer in communication with said system controller.
14. (original) The tufting machine of claim 1 and wherein said control system includes a system controller for said yarn feed unit, wherein said system controller of said yarn feed unit is in communication with a machine controller that includes a design center component.
15. (original) The tufting machine of claim 1 and wherein said control system comprises a tufting machine controller for controlling operation of the tufting machine and said drive motors of said yarn feed unit according to programmed pattern instructions.
16. (currently amended) A method of assembling a tufting machine having a frame and at least one reciprocable needle bar having a series of spaced needles mounted therealong and carrying a series of yarns for forming tufts of yarn in a backing material passing beneath the needles, comprising:

 mounting at least one yarn feed unit on the frame of the tufting machine, the yarn feed unit having a predetermined number of yarn feed devices mounted therein for feeding a series of yarns to the needles, yarn feed controllers controlling the yarn feed devices, and a yarn feed distribution device;

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connecting the yarn feed controllers to a system controller for controlling the feeding of the yarns to the needles by each of the yarn feed devices; and ~~threading the feeding multiple yarns from a desired number each~~ of the yarn feed devices, with each yarn fed through separate yarn feed tubes of the yarn feed distribution device to each of the needles.

17. (original) The method of claim 16 and further comprising selecting one or more standardized, self-contained yarn feed attachments each having a predetermined number of yarn feed devices.
18. (original) The method of claim 16 and wherein connecting the yarn feed controllers to a system controller comprises establishing at least one network connection between the system controller and the yarn feed controllers.
19. (original) The method of claim 18 and wherein establishing at least one network connection between the yarn feed controllers and the system controller comprises providing the system controller with a series of network cards and connecting at least one network card to the yarn feed controllers to establish a first network channel and connecting another of the network cards to at least some of the yarn feed controllers to establish a second network channel.

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20. (original) The method of claim 18 and wherein establishing at least one network connection between the yarn feed controllers and the system controller comprises running multiple networks on at least one network channel.
21. (canceled)
22. (original) A tufting machine for forming tufts of yarns in a backing material, comprising:
a needle bar having a series of needles spaced therealong;
a yarn feed unit mounted on the tufting machine and including a series of yarn feed devices for feeding the yarns to the needles;
a yarn feed tube bank constructed and arranged to guide the yarns to various ones of the needles and having at least two separate tube bank sections receiving yarns from the yarn feed devices of the yarn feed unit; and
a control system for controlling operation of the yarn feed devices based on programmed pattern information.
23. (original) The tufting machine of claim 22 and wherein said yarn feed unit comprises a self-contained attachment having a predetermined number of yarn feed devices and adapted to be releasably mountable on the tufting machine.
24. (original) The tufting machine of claim 22 and wherein said tube bank sections are scrambled.

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25. (previously amended) The tufting machine of claim 22 wherein each of said yarn feed devices feeds at least two yarns each through separate tubes of said tube bank sections to said needles.
26. (original) The tufting machine of claim 22 and wherein said yarn feed unit further comprises a plurality of yarn feed controllers in communication with said control system for controlling said yarn feed devices.
27. (original) The tufting machine of claim 22 and wherein said yarn feed controllers each comprise a circuit board having a control processor and a series of motor controllers, each in communication with said control processor and with at least one of said drive motors of said yarn feed devices for controlling the feeding of the yarns by said yarn feed devices.
28. (previously amended) The tufting machine of claim 22 and wherein said control system includes yarn feed unit system controller running at least one network over which said yarn feed controllers receive instructions from and communicate with said system controller.

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29. (previously amended) The tufting machine of claim 22 and further comprising a housing having a unit mounting plate adapted to mount said housing on the tufting machine, and a series of mounting plates for mounting said yarn feed devices within said housing.

30. (original) The tufting machine of claim 22 and wherein said control system includes a system controller for said yarn feed unit, wherein said system controller of said yarn feed unit is in communication with a machine controller that includes a design center component.

31. (original) A yarn feed unit for controlling the feeding of individual yarns to a series of spaced needles in a tufting machine for forming a series of tufts of yarn in a backing material, said yarn feed unit comprising:

- a plurality of yarn feed devices each including a drive motor driving a drive roll for engaging and feeding selected ones of the yarns to one of the needles; and

- a yarn feed controller communicating with and controlling operation of said drive motors of said yarn feed devices for controlling the feeding of the yarns in response to programmed pattern instructions; and

- a yarn feed distribution device having a series of yarn feed tubes arranged in separate tube bank sections each receiving one of the yarns from said yarn feed devices for guiding the yarns to selected needles of the tufting machine.

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32. (original) The yarn feed unit of claim 31 and wherein said yarn feed unit is manufactured as a self-contained attachment having a predetermined number of yarn feed devices and is releasably mountable to the tufting machine.
33. (previously amended) The yarn feed unit of claim 31 wherein each of said yarn feed devices feeds at least two yarns each through separate tubes of said tube bank sections to said needles.
34. (previously amended) The yarn feed unit of claim 31 and wherein said yarn feed controller comprises a circuit board having a control processor and a series of motor controllers, each in communication with said control processor and with at least one of said drive motors of said yarn feed devices for controlling the feeding of the yarns by said drive motors.
35. (previously amended) The yarn feed unit of claim 31 and wherein said yarn feed unit comprises a self-contained attachment having a series of mounting plates in which a predetermined number of yarn feed devices are received.
36. (previously amended) The yarn feed unit of claim 31 and further comprising a system controller running at least one network over which said yarn feed controller receives instructions from and communicates with said system controller.

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37. (previously amended) The yarn feed unit of claim 31 and wherein said tube bank sections are scrambled.
38. (previously amended) The yarn feed unit of claim 31, wherein said yarn feed controller of the yarn feed unit is in communication with a machine controller that includes a design center component.
39. (previously added) The yarn feed unit of claim 31 and wherein said yarn feed controller comprises a series of drives for said drive motors, each of said drives controlling one or more of said drive motors.
40. (currently amended) A tufting machine for introducing tufts of yarns into a backing material, comprising:
- a needle bar having a series of ~~space~~ spaced needles;
 - at least one yarn feed unit comprising:
 - a series of yarn feed devices for feeding yarns to the needles;
 - a yarn distribution device having at least one tube bank section having a series of separate yarn feed tubes through which each of the yarns are directed to selected needles wherein said yarn feed tubes are scrambled and of a number sufficient to form at least two pattern repeats across the backing material; and

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a control system in communication with the yarn feed devices to provide instructions for controlling the yarn feed devices in accordance with programmed pattern information.

41. (previously added) The tufting machine of claim 40 and wherein the at least one yarn feed unit further comprises a series of yarn feed controllers controlling at least one of the yarn feed devices.
42. (previously added) The tufting machine of claim 40 and wherein the at least one yarn feed unit further comprises a series of yarn feed controllers each controlling two or more of the yarn feed devices.
43. (previously added) The tufting machine of claim 40 and wherein the at least one yarn feed unit comprises a system controller in communication with the yarn feed devices and running at least one network over which instructions are sent to the yarn feed devices.
44. (canceled)
45. (currently amended) The tufting machine of claim 40 wherein each of said yarn feed devices feeds at least two yarns each through separate tubes of ~~said~~ a plurality of tube bank sections to said needles.

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46. (previously added) The tufting machine of claim 40 and wherein said control system includes a design center component.
47. (previously added) The tufting machine of claim 40 and wherein each yarn feed device comprises a drive motor and a drive roll driven by the drive motor to feed the yarns.